

Kentucky Class Notes

Helping You Succeed in the Classroom

Call (859) 252-NOTE!

BIO 315 Kellum

Test #1

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01-09-08

Ch. 1: Introduction to the Study of Cell Biology

The Discovery of Cells:

- In the mid-1600's **Robert Hooke** examined a slice of cork and became the first person to coin the term "cell".
- **Anton van Leeuwenhoek** observed living "animalcule" cells and observed the first bacterium.

Light Microscopy (fig 18.1 & 18.2):

- Light is focused through condenser lenses and passes through a thin specimen.
- Light is then reflected off of the specimen through a series of magnifying objective lenses.
- The ocular lens (the eyepiece) allows for further magnification.
 - The maximum magnification is 1000 times the normal size of the specimen.

Resolution:

- Resolution is the ability to resolve two points separately/
- It is given as a distance and determined by the wavelength, λ , of light.
 - The lower the wavelength, the less the scatter, the less the blur and the higher the resolution.

Electron Microscopy (fig 18.12)

- A beam of electrons is used instead of a beam of light.

- The electrons have a lower wavelength than light so a higher resolution can be achieved. This makes it easier to see the ultrastructure (membranes/organelles).
- Electromagnetic lenses focus the electron beam instead of a glass objective lens focusing light.
- Heavy metal stains on specimen reflect electrons onto a magnifying projector lens that projects onto a fluorescent viewing screen or photographic film.
- **Transmission electron microscopes** pass electrons through their specimens.
- **Scanning electron microscopes** are similar to light microscopes.

Epi-fluorescence Microscope (*diagram posted on web and on pg. 6 of manual*)

- This microscope limits the wavelength of light that hits the specimen as well as the light that is collected from the specimen.
- It requires a filter between the light source and the specimen to filter out the light that doesn't excite the desired wavelength.
- A barrier filter is used to select the wavelength of light that gets from the specimen to the light.
- With the Epi-fluorescence microscope, you must have a fluorescent probe on the molecule/antibody of interest.
 - Attaching probe by one of three processes:
 1. Express the specific protein in bacteria, purify it and link the fluorescent molecule to it **in vitro**.
 2. Use an antibody that is fluorescently labeled to recognize specific proteins. The antibody stains the fixed specimen of the cell that is